REMARKS

The office action of April 5, 2006 has been reviewed and its contents carefully noted. Reconsideration of this application, as amended, is respectfully requested. Claims 1-7 and 9-13 remain in this application. Claims 1 and 10 have been amended.

Since this amendment and response is being sent within the sixth month from the issuance of the Office Action, the three month extension fee is being electronically paid simultaneously with the submission of this paper.

Interview

Applicants' attorney expresses his sincere appreciation to Examiner Kathleen McNelis for taking time to conduct the telephonic interview of September 14, 2006 with Applicants' attorney. The undersigned especially thanks the Examiner for the courteous and professional manner in which the interview was conducted.

Restriction Requirement

The Examiner has maintained the restriction originally set forth in the Office Action of December 15, 2005. Accordingly, Applicants withdraw from consideration in the present application, without prejudice, claims 22-24.

Rejection under 35 U.S.C. 103

Claims 1-7 and 9-13 stand rejected under 35 USC 103 as being upatentable over Kosco '747 in view of Baran et al and Graupner et al. and Kempe et al. Applicants respectfully traverse.

Kosco discloses a process by which a metallurgic powder is compacted at a pressure between 20 to 70 tsi, heated to 2000°F to 2400°F for 15 to 120 minutes, and then cooled at a rate no greater than 60°F per minute to room temperature, to ensure that the compact may be capable of being mechanically worked. Then, the compact is deformed to increase the density. After the densification step, the compact is heated again to 2050°F-2400°F and cooled at a rate of 160°F - 400°F/min to room temperature. A secondary tempering operation may follow. The densification step in Kosco is necessary to increase the surface density of the part to facilitate mechanical working.

The Examiner states that, "Kosco further discloses wherein the forming a densified portion includes hot forming at a temperature of 1800°F for 3 minutes (see Example 2), in the temperature limitation of Applicant's step d) but for less time. The Examiner finding that the time limitation of a small part such as a race would lead to total heating of the part, resulting in the same desired effects as claimed."

This is not what occurs when following Applicants' claimed method. Referring to claim 1, step d) refers to "cooling the compact at a rate of 10°F to 120°F to ambient temperature". This is clearly not related to hot forming the compact. The example cited from Kosco relates to densification. However, Applicant's claim 1 states "without substantial densification" (emphasis added). Applicants want to particularly point out that their process does **NOT** perform hot forming on the workpiece. Accordingly, Example 2 of Kosco, cited by the Examiner to support the grounds of rejection, in effect teaches away from Applicant's claimed invention.

The Examiner states that "Kosco thus differs from the claimed invention by the alloy additions and the full range of various temperature treatments" and that "Kosco further discloses heating parameters selected for the *same purposes* as disclosed by Applicant, and would be modified by one of ordinary skill based on the selection of the initial starting alloy in order to achieve the same utility as the disclosed invention." (emphasis added). Applicants respectfully disagree with this assertion. The process of Kosco is for the purpose of creating *surface densification* which improves wearability and overall durability of the final product. The instant process does NOT perform surface densification. This distinction cannot be ignored. Further, as shown in claim 1, the difference between the temperature ranges of Kosco and Applicant's

invention are significant and result in different effects on the compact. In Kosco, the compact is heated to 2000°F to 2400°F for 25 to 30 minutes. However, Applicant's method as stated in claim 1 requires the compact to be heated within a range of temperatures, 1400°F to 2000°F. The starting temperature of the Kosco method is at the ending temperature of Applicant's method.

Baran et al disclose including silicon in metal powder to increase *hardenability*, elongation, and tensile strength. Applicant's powder composition is not defined in claim 1, but rather in dependent claim 12. As such, a rejection based on this reference is only relevant to dependent claim 12 and not claim 1. Applicants' claim 1 creates a compact after sintering that is "without substantial densification" (part e). The use of this reference as grounds for rejecting claim 1 is counterintuitive and teaches away from Applicants' method as defined in claim 1.

The Examiner acknowledges that, "Kosco '747 is silent to grinding as a working step." and therefore adds Graupner et al. to reinforce the weakness of the Kosco teachings. However, Graupner et al. does not sufficiently provide what Kosco lacks. Graupner et al. disclose a method to "overcome the limitations of misalignment between gear teeth and, misalignment between gear teeth and the gear centerline, or lead line error, ...avoids the requirement for honing and undercutting the root area between adjacent gear teeth... the gears are regenerated by skiving the gear after heat treatment to realign the gear teeth with each other and the gear centerline, to overcome misalignment and lead line error" (col. 3, lines 8-18). "This process serves to skive or remove extremely thin layers of material on the involute surfaces of gear teeth to thereby regenerate tooth surfaces" (col. 5-6, lines 60-3).

It is important to note that Graupner et al. employ the skiving operation *after* heat treating. Therefore, this operation is performed on a fully *hardened* finished part (claim 1) or one that is hardened on"...at least the gear surface..." (col. 5, line 31). The small amount of material removed from the gear teeth is 0.005 to 0.007 inches and the material is removed without contacting the root or undercutting the root of the gear teeth (col. 6, lines 13-18). The disclosure of Graupner et al. clearly teaches away from Applicants' claimed method. The Examiner's attention is kindly directed to Exhibits Band C, which were previously submitted, to help clearly show the distinction between the grinding process of Graupner et al. and that of the

instant process. The combination of Kosco and Graupner et al. suggest skiving only a small amount of material from the *hardened* surface of gear teeth to correct misalignments that might have resulted from the completed operations of sintering, deforming the part and heat treating. This is in clear contrast to Applicants' process of machining or grinding a large amount of *non-hardened* material to produce a profile with detailed geometry which is performed *prior* to the heat treatment and hardening steps described in sections f and g of instant claim 1.

Kempe et al. disclose a feed wheel for use in a wood working machine. This reference is not specific about how the wheel is formed and only discusses the best way to configure the teeth of the wheel "in order to facilitate efficient driving of [a] wood piece" (col. 3, lines 37-39). Applicant is not claiming gear geometry. Rather, Applicant is claiming a method of producing sprockets using powdered metal. Kempe et al. is silent as to grinding and does not provide what Kosco or Graupner et al. lacks in this regard.

The combination of Kosco in view of Baran et al. and Graupner and Kempe et al. would result in a metallurgic powder containing silicon that is compacted between 20 to 70 tsi, heated to between 2000°F and 2400°F for 15 to 120 minutes, and then cooled at a rate no greater than 60°F per minute to room temperature so as to prepare the compact for surface densification. Then, the compact is deformed to increase the density. After densification, the compact is heated again to between 2050°F and 2400°F and cooled at a rate of 160°F - 400°F/min to room temperature, with a secondary tempering operation. After the part is quenched and tempered, a grinding operation is performed to correct or reduce misalignment between gear teeth, adjacent gear teeth flanks and to reduce lead line error of the gear, a process that only removes 0.005 to 0.007 inch. The teeth of the sprocket may have gear geometry that facilitates the efficient driving of a *wood piece*.

The method of the Applicants' invention would clearly not obtain from the combination of the cited references. It is respectfully submitted that rejection of claims 1-7 and 9-13 be favorably reconsidered and withdrawn.

During the telephonic interview noted above, the Examiner raised a point with respect to the specific order of the steps of the methods set forth in independent claims 1 and 10. Accordingly, claims 1 and 10 have been amended to require that each of the steps be performed

in the order presented. Support for this amendment may be found in the order of the individual steps described in the Detailed Description of the Invention, the flow chart of Figure 1 and the second paragraph of the Example, as set forth in the specification as filed.

Conclusion

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with Applicants' attorney would advance the prosecution of the case to finality, she is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

Respectfully Submitted:
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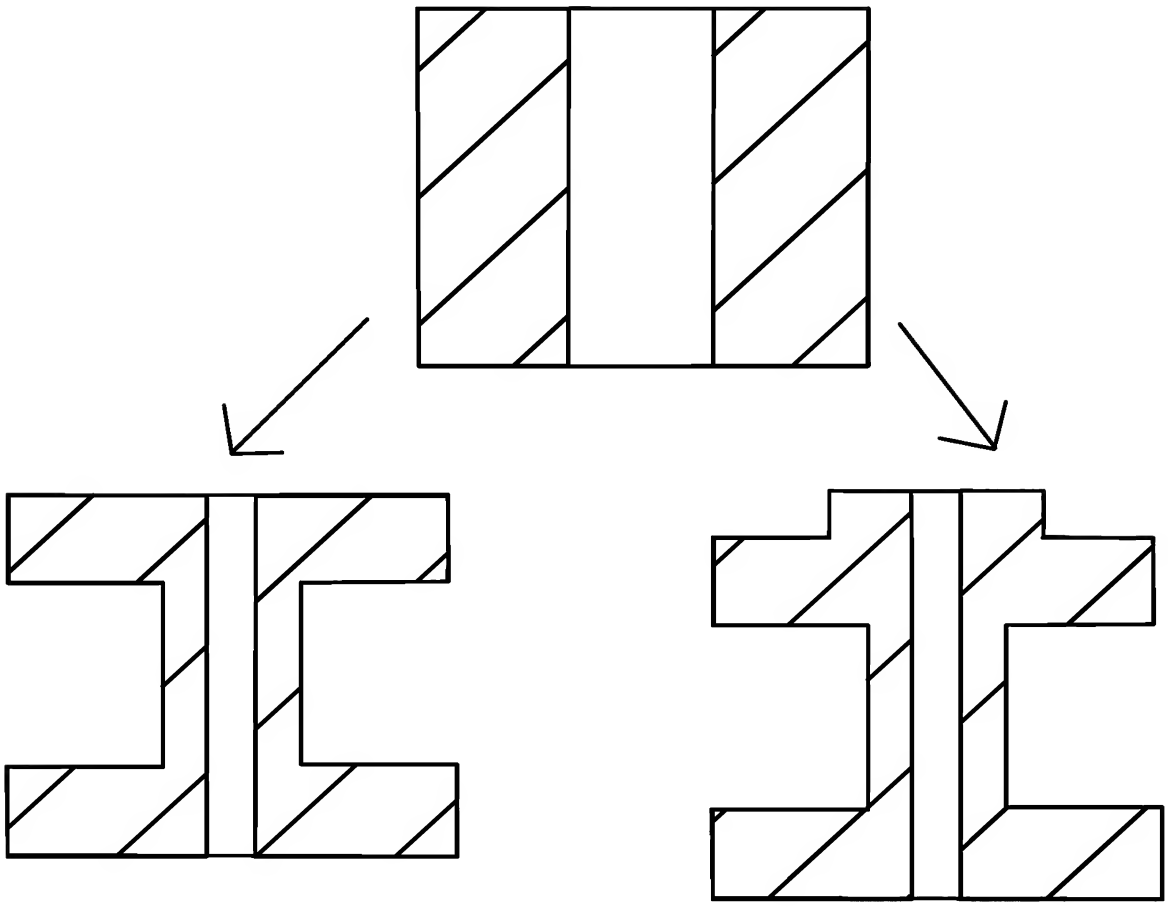
Exhibit B

Applicant's Grinding



Graupner et al. Grinding

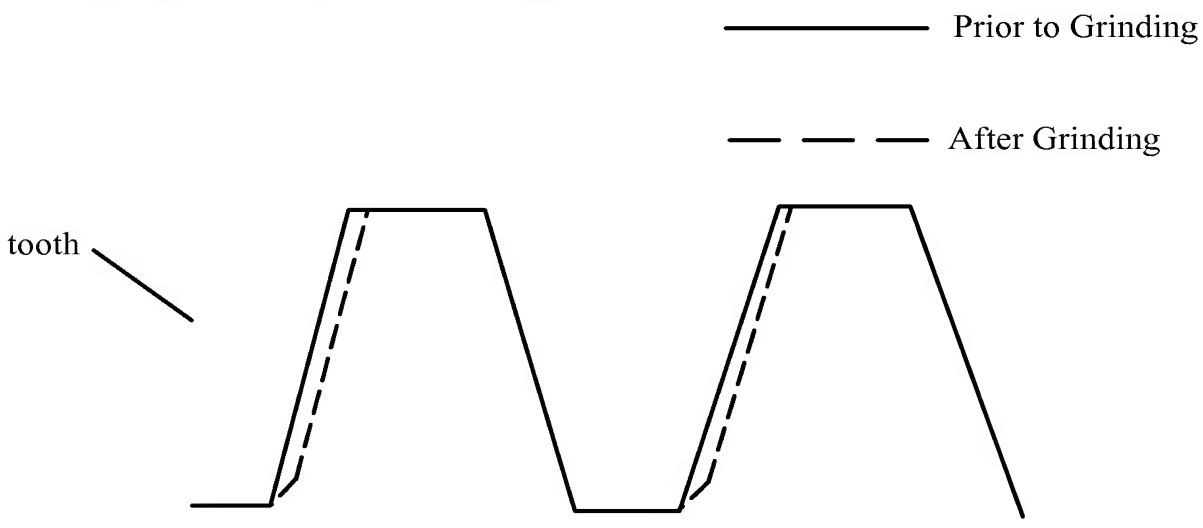
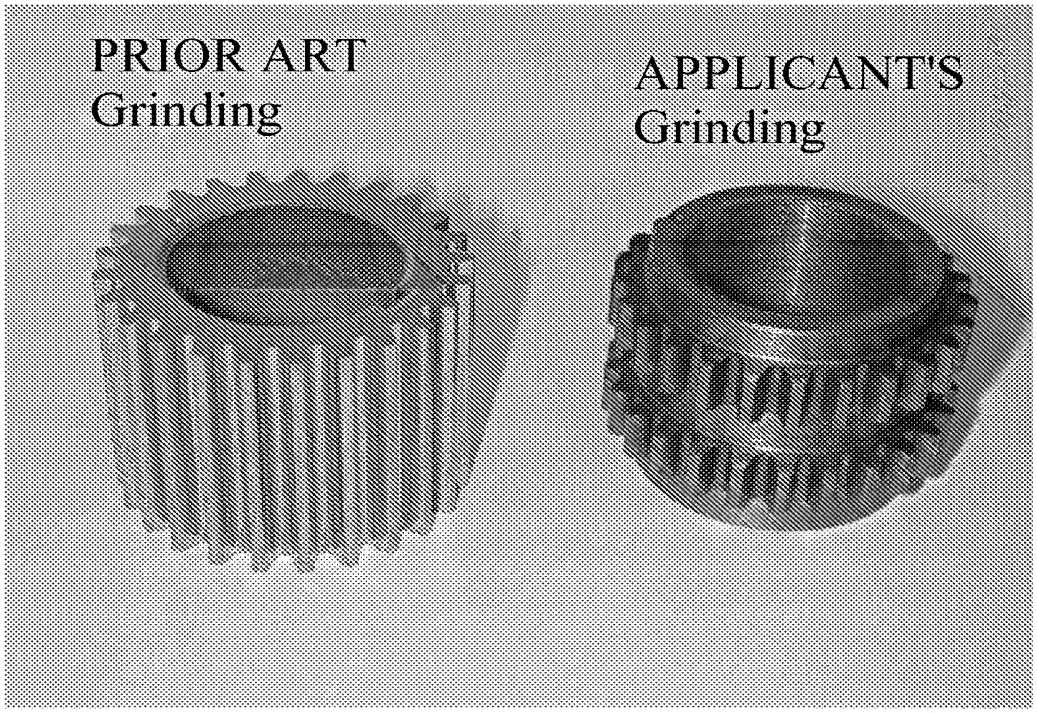


Exhibit C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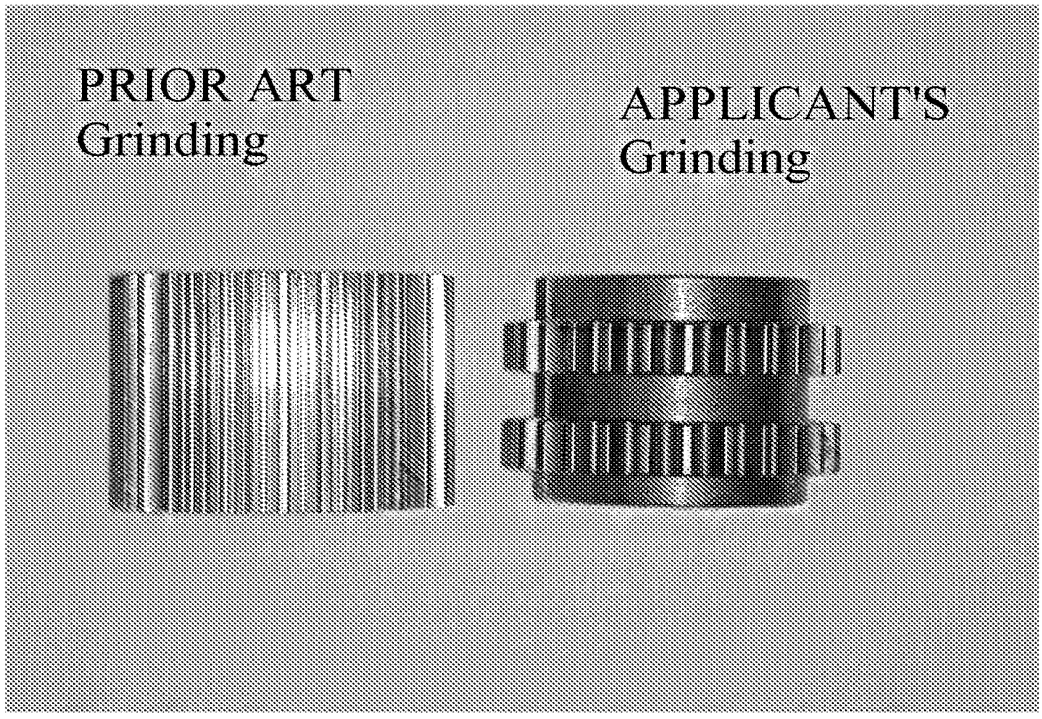
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